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ABSTRACT

This book brings together leading experts to offer an in-depth examination of how computer technology can play an invaluable part in educational efforts through its unique capacities to support the development of students' understanding of difficult concepts. Focusing on three broad themes-the nature of understanding, the potential of technology in the classroom, and the transformation of educational theory into practice-the contributors discuss a wealth of subjects central to any efforts that intend to improve schools. Topics range from the difficulties students encounter when learning new ideas, to how the right software allows for hands-on manipulation of abstract concepts, to the social realities of the educational environment. Chapters include: (1) "Can Technology Help Teach for Understanding?" (Nickerson, Raymond); (2) "Use of History of Science To Understand and Remedy Students: Misconceptions about Heat and Temperature" (Wiser, Marianne); (3) "On Understanding the Nature of Scientific Knowledge" (Carey, Susan; and Smith, Carol); (4) "History of Mathematics as a Tool for Teaching Mathematics for Understanding" (Vasco, Carlos); (5) "Inside Understanding" (Perkins, David; Crismond, David; Simmons, Rebecca; and Unger, Chris); (6) "Shuttling between the Particular and the General: Reflections on the Role of Conjecture and Hypothesis in the Generation of Knowledge in Science and Mathematics" (Schwartz, Judah); (7) "Conceptually Enhanced Simulations: A Computer Tool for Science Teaching" (Snir, Joseph; Smith, Carol; and Grosslight, Lorraine); (8) "Creating Cybernetic and Psychological Ramps from the Concrete to the Abstract: Examples from Multiplicative Structures" (Kaput, James); (9) "Multiple Representations: A Vehicle for Understanding Understanding" (Goldenberg, E. Paul); (10) "The Right Size Byte: Reflections of an Educational Software Designer" (Schwartz, Judah); (11) "A Cultural Perspective on School-University Collaboration" (Wiske, Martha); (12) "Managing the Tensions in Connecting Students' Inquiry with Learning Mathematics in School" (Lampert, Magdalene); (13) "Constructing

Understanding in the Science Classroom: Integrating Laboratory Experiments, Student and Computer Models, and Class Discussion in Learning Scientific Concepts" (Snir, Joseph; and Smith, Carol); (14) "Teaching the Metacurriculum: A New Approach to Enhancing Subject-Matter Learning" (Schwartz, Steven; and Perkins, David); and (15) "Integrating Computers into Classroom Teaching: Cross-National Perspectives" (Vickers, Margaret; and Smalley, Jane). (JRH)

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